

1 1. An imaging device comprising:
2 an optical plate made of an optically transparent material and forming a surface for
3 receiving a finger;
4 a light source positioned to illuminate the finger receiving surface;
5 an imaging system positioned to receive light collected from the finger receiving
6 surface and to form an image of a fingerprint pattern of the finger based on the received light;
7 in which the optical plate has an index of refraction less than 1.49.

1 2. The device of claim 1 in which the optical plate material includes TPX.

1 3. The device of claim 1 in which the optical plate material includes Butyrate.

1 4. The device of claim 1 in which the optical plate material includes silicone.

1 5. The device of claim 1 in which the light source is positioned at a second
2 surface of the optical plate.

1 6. The device of claim 5 further including a reflective surface positioned at a
2 third surface of the optical plate to collect light from the finger receiving surface and to focus
3 the collected light on the imaging system.

1 7. The device of claim 6 in which the imaging system is positioned at a fourth
2 surface of the optical plate.

1 8. The device of claim 1 in which the optical plate has an index of refraction less
2 than 1.44.

1 9. The device of claim 1 in which the imaging system comprises:
2 an aperture at a second surface of the optical plate;
3 an objective at the aperture; and

4 a detector for receiving light collected by the aperture and the objective to form the
5 image of the fingerprint pattern.

1 10. The device of claim 9 in which the imaging system comprises a reflective
2 surface positioned between the objective and the detector for collecting light from the
3 objective and for focusing the light onto the detector.

1 11. The device of claim 9 in which the detector comprises a CCD.

1 12. The device of claim 9 in which the detector comprises a CMOS sensor.

1 13. The device of claim 9 in which the aperture defines an aperture beam of light
2 rays used by the detector to form the fingerprint pattern image.

1 14. An imaging device comprising:
2 an optical plate made of an optically transparent material and forming a surface for
3 receiving a finger having an index of refraction;
4 a light source positioned to illuminate the finger receiving surface;
5 an imaging system positioned to receive light from the finger receiving surface and to
6 form an image of a fingerprint pattern of the finger based on the received light;
7 in which the optical plate has an index of refraction less than the index of refraction
8 of the finger.

1 15. The device of claim 14 in which the optical plate includes silicone.

1 16. An optical plate for use in imaging a fingerprint, the optical plate comprising:
2 an optically transparent material that forms a surface for receiving a finger;
3 a second surface for coupling to an imaging system that receives light collected from
4 the finger receiving surface and that forms an image of a fingerprint pattern of the finger
5 based on the received light; and
6 a third surface for coupling to a light source that illuminates the finger receiving
7 surface;

8 in which the optical plate has an index of refraction less than 1.49.

1 17. A method of imaging a fingerprint, the method comprising:
2 providing an optical plate made of an optically transparent material having an index
3 of refraction less than 1.49, the optical plate having a surface for receiving a finger;
4 receiving a finger at the finger receiving surface;
5 illuminating the finger receiving surface with a light source;
6 collecting light reflected from the finger receiving surface; and
7 receiving the collected light at an imaging system to form an image of a fingerprint
8 pattern of the finger based on the received light.

1 18. A method of imaging a fingerprint, the method comprising:
2 providing an optical plate made of an optically transparent material having an index
3 of refraction, the optical plate having a surface for receiving a finger;
4 receiving a finger at the finger receiving surface, the finger having an index of
5 refraction;
6 illuminating the finger receiving surface with a light source;
7 collecting light reflected from the finger receiving surface; and
8 receiving the collected light at an imaging system to form an image of a fingerprint
9 pattern of the finger based on the received light;
10 in which the index of refraction of the optical plate is less than the index of refraction
11 of the finger.

1 19. A method of forming an optical plate, the method comprising:
2 molding a silicone material into a base;
3 forming a reflective device; and
4 attaching the reflective device to the base to form a reflective interface between the
5 base and the reflective device.

1 20. A method of forming an optical plate, the method comprising:
2 forming a transparent hollow device having sides;

- 3 applying a coating to an inner surface of one of the sides to form a reflective surface
- 4 on that side;
- 5 dispensing silicone material into the hollow device; and
- 6 hardening the silicone material to form the optical plate.